MASTER'S THESIS

Exercising alignment in a turbulent environment

A quantitative study on the impact of co-evolutionary IS alignment on dynamic capabilities in public organizations

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Abstract

Many studies have examined the impact of information technology (IT) on realizing organizational performance, and on the benefits of business IT-alignment in particular. However, despite the body of knowledge on business-IT alignment, for most companies alignment is still seen as an unreachable goal to achieve: it is not clear how to employ alignment to cope with the fast-changing external environment that is increasingly dependent on technology. To extend on the shortcomings of business-IT alignment, this study examines alignment within the domain of complexity science by employing the concept co-evolutionary IS-alignment (COISA) and proposes a view of IS alignment that is dynamic, co-evolutionary and continuously intertwined in the business environment. A thorough literature review was conducted to develop a conceptual model that disclosed three hypotheses that were tested by means of a quantitative study. A survey was distributed amongst IT professionals that are active in the public sector and the outcomes of this study provide recommendations for further research on COISA.

Key terms

complexity science, co-evolutionary IS alignment, business-IT alignment, dynamic capabilities, alignment motivation, public sector

Summary

The globalization, automation and digitization of the world as we know it create an ever increasing dependency on technology and lead to an environment where organizations that are not able or willing to cope with these changes will get left behind. Organizations in the public sector face an even more complicated situation: not only do they have to cope with a continuous changing external environment, they also need to manage potentially colliding cooperation to make sure that external partners do not collide with their own values.

Although business-IT alignment is extensively researched and, over the last decades, an expansive body of knowledge has been developed, for most companies alignment is still seen as an unreachable and unclear goal to achieve. This study examines the concept co-evolutionary IS-alignment (COISA) and proposes a view of IS alignment that is dynamic, co-evolutionary and continuously intertwined in the business environment.

Based on an extensive literature review, a conceptual model was created to support the main research question of this study: what is the impact of co-evolutionary IS alignment on the dynamic capabilities of organizations in the public sector? Moreover, from the conceptual model, three hypotheses emerged which state that operational, strategic and IS orchestration alignment competencies have a positive impact on dynamic capabilities (H1), interconnections between heterogeneous employees moderate the effect of alignment competencies on dynamic capabilities in a positive way (H2) and alignment motivation moderates the effect of alignment competencies on dynamic capabilities in a positive way (H3).

The conceptual model is validated by a quantitative research: data is collected by means of a survey that was distributed amongst IT professionals currently employed in the public sector. The data collected provides information on the impact of alignment competencies on dynamic capabilities, and also produces insights on the moderating role of interconnection between heterogeneous employees and alignment motivation. The gathered data was analyzed using SmartPLS software.

The results of the data analysis confirm that alignment competencies have a positive effect on dynamic capabilities. Moreover, it supports the view of alignment competencies as a construct consisting of three elements: operational, strategic and IS orchestrational alignment competencies. The results regarding the moderating role of interconnections between heterogeneous employees and alignment motivation did not prove to be significant and showed a negligible negative effect. This means that no conclusion could be reached regarding the moderating role of these variables.

Contents

1. Introduction

1.1. Turbulent challenges in a fast-changing environment

The globalization, automation and digitization of the world as we know it create an ever increasing dependency on technology and lead to an environment where organizations that are not able or willing to cope with these changes will get left behind (Farazmand, 1999a, 1999b; James, 2001, 2002; Baliga & Jaeger, 1984). Although only referring to economic globalization, Madon articulates the important role of information technology by stating that "*Information technology is at the core of the current process of economic globalization*" (1997, p. 227).

But how do organizations make sure that they keep up with the inevitable challenges that come with today's fast-changing and technology dependent business environment? What do these organizations need to change to remain the sustainable and successful organizations that they thrive to be? When examining characteristics that can be associated with remarkable performances, research shows that these high performances are "*attributed to companies characterised by a higher degree of alignment"* (Avison et al., 2004; Croteau and Bergeron, 2001; Venkatraman, 1989 and Coltman et al. 2015 in: Amarilli, Van Vliet and Van Den Hooff, 2017, p. 1). Alignment can be defined as "*the continuous process, involving management and design sub-processes, of consciously and coherently interrelating all components of the business-IT relationship in order to contribute to the organisation's performance over time*" (Amarilli et al., 2017, p.3).

Although alignment is extensively researched and, over the last decades, an expansive body of knowledge has been developed, for most companies alignment is still seen as an unreachable (and unclear) goal to achieve (Amarilli et al., 2017). In this chapter, the concept co-evolutionary IS-alignment (COISA) is introduced to propose a view of IS alignment that is dynamic, co-evolutionary and continuously intertwined in the business environment. Subsequently, the problem statement will be presented, which will lead to the research objective of this study that is focused on alignment in organizations in the public sector.

1.2. COISA and dynamic capabilities

From Alignment to COISA

One way to conceptualize alignment is with a static approach, which "*assumes that alignment is a condition of the company that can be measured at a given point in time*" (Amarilli et al., 2017, p. 3). This approach defines alignment through a static relationship and does not reflect the reality of companies that operate in a constantly changing business environment and therefore continuously re-adjust their information systems (IS) (Chan & Reich, 2007; Baker et al., 2011).

The approach of IS as a socio-technical system defines alignment as a co-evolutionary phenomenon involving IS and business (Benbya & McKelvey, 2006; Peppard & Campbell, 2014; Vessey & Ward, 2013) in a process of mutual adaptation (Amarilli et al., 2017) and will be used as a fundamental part of the operationalization of alignment in this research.

The theory of COISA focuses on the simultaneous and continuous evolution in both the IT- and the business domain, and the interaction between these domains (Amarilli et al., 2017; Benbya, 2006; Walraven et al., 2019a). Walraven (2019a) defined COISA as: "*continuously exercised operational, orchestrational and strategic alignment competencies characterized by co-evolution between different IS stakeholders in pursuit of Business-IT alignment*". Moreover, COISA is hypothesized to be especially valuable for organizations in complex conditions, which are tantamount in the public sector (Pang et al., 2014; Walraven et al., 2018a, 2018b; Walraven et al., 2019a).

The public sector and its challenges

Being a successful organization has a different meaning for public organizations than it has for organizations active in the private sector, being caused mainly by the goals these organizations set and the environment they operate in. Organizations in the private sector "*promote the pursuit of private interest rather than of the public interest*" (Appleby, 1945; deLeon & Denhardt, 2000; Frederickson, 2005; Bozeman, 2007; Kernaghan, 2000; Kolthoff et al., 2007 in Gabel-Shemueli & Capell, 2013, p. 593). Organizations in the public sector face a more complicated situation because of their complex organizational structures and cooperation with many different internal and external stakeholders (Pang, Lee & Delone, 2014). They are in constant evolution with internal complexity (interaction between individuals from within the organization or their moral and ethical values) and external complexity (interaction with stakeholders, partners, collaborations) (Allen & Varga, 2006). In addition, the crucial role of values in public organizations should be acknowledged: "*to the extent that their raison d'être as organizations is serving society, values are their "soul" and integral to their mission*" (Gabel-Shemueli & Capell, 2013, p. 586). Not only do organizations within the public sector have to cope with a continuous changing external environment; they also need to manage potentially colliding cooperation to make sure that external partners do not interfere with their own values (Pang et al., 2014).

Hence, public organizations exist on the virtue of complexity and can thus be regarded as complex systems, defined by Allen and Varga (2006) as "*open systems that interact with the environment and with other complex systems*" (p. 229). Comprehending the complexity resulted by these many interactions will enable an organization to understand and predict which changes are needed to adapt to the fast changing (technological) environment. In this research, the focus will be on the impact of COISA on the organization's ability to cope with these internal and external complexities, which will be further explored as the organization's dynamic capabilities.

Defining proficiency in a continuously changing environment

Dynamic capabilities can be defined as "*the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments*" (Teece, Pisano & Shuen, 1997, p. 516). Wilden et al. (2013) write that dynamic capabilities are directed towards strategic change and the alignment of the organization with the environment. Teece (2007) disaggregated dynamic capabilities into a firm's capacity to: "*sense and shape opportunities, seize opportunities, and redeploy and reconfigure (create, extend and modify) their resource base*" (Wilden et al., 2013, p. 5). Being able to sense, shape and seize opportunities can be seen as an important quality to cope with a continuous changing external environment (Pang et al., 2014). However, in this research an even more developed operationalization of dynamic capabilities as introduced by Janssen, Castaldi and Alexiev (2016) is employed. The first dimension of dynamic capabilities used in this study is (1) "Sensing user needs and (technological) options", which "*provides ideas for new or altered propositions*" (Janssen et al., 2017, p. 5). Secondly, the dimension (2) "Conceptualizing" corresponds to capabilities essential for taking an idea and to cultivate it into a detailed proposition. Finally, Janssen et al. (2016) write that [3] "*'(co)producing and orchestrating', as well as* [4] *'scaling and stretching', are related to efforts in which a new service is actually delivered to the market*" (p. 5), and together form the third and fourth dimension to assess the construct dynamic capabilities.

The definition of COISA used in this research underscores the interrelations of all alignment components of the business-IT relationship in order to impact the organization's performance

(Walraven, 2019a). Furthermore, other literature supports the view that (organizational) alignment seems to be positively associated with dynamic capabilities or competitive firm performance (Yu Yuan Hung, Chung & Ya-Hui Lien, 2007; Wetering, Mikalef, & Pateli, 2017; Wilden et al., 2013).

1.3. Problem statement

Although public organizations are dependent on the interaction between individuals for organizational co-evolution between business and IT, managers in the public sector are vigilant when it comes to the bureaucratic impediments that arise with innovative practice (Stewart 2014). Although Stewart's study (2014) shows that "*as they are implemented, many innovations* [in public organizations] *run up against restrictions and limitations, precisely because many systems and processes* […] *are involved*" (p. 249), there have only been a limited amount of studies on implementing innovation in the public sector. The absence of studies on the implementation of innovating technologies or projects in the public sector reflects the limited amount of studies on COISA and dynamic capabilities. These concepts focus on the way business and information systems are aligned and the way in which these disciplines work together in a changing and dynamic environment. Furthermore, the complexity of the many internal and external interactions unique to public organizations requires research that is deliberately and solely focused on this sector.

1.4. Research objectives, motivation and relevance

The aim of this research is to bridge the gap between the internal and external complexity public organizations face when striving for business and IT alignment. Public organizations operating in the fast changing IT environment might face difficulties with the incorporation of a sustainable business and IT alignment because of the many different, sometimes colliding, interests that they have to manage. Moreover, they have to take into account their societal responsibility when interacting with internal and external complexities, which could make a study that is specified to their sector practically beneficial to their operations. This research contributes to the - to date not extensive - body of work on COISA, and will propose suggestions for further research that will be needed to keep up with the study of this particular field of work and its rapidly changing context.

This study will be guided by the following research question:
What is the impact of co-evolutionary IS alignment on the dynamic capabilities of organizations in the public sector?

1.5. Main lines of approach

This study will be conducted as a quantitative, survey-based research. In chapter 2, the theoretical framework of the study will be outlined and will lead to the conceptual framework that will be elaborated on in the methodology section in chapter 3. Also in chapter 3, the main approach used for the research will be outlined, including the technical design and data analysis. In chapter 4, the implementation of the research will be described and chapter 5 discusses the outcomes that have been obtained through the research.

2. Theoretical framework

In this chapter, the research approach of the elaborately performed literature review is outlined and will be of essential value in determining the theoretical framework of this study. In the second section, the method of the theoretical literature review is explained, followed by the results and conclusions in section three. In this third section, the hypotheses set for this study are introduced including a conceptual model of COISA (Figure 2.1) that will be used in this research. In the last section, the objective of follow-up research is set forth briefly.

2.1. Research approach

To answer the leading research question of this study, an elaborate literature review was executed. For this research, a theoretical review was employed; a type of critical review that Saunders, Lewis & Thornhill (2016) define as "[a review that] *examines the body of theory that has accumulated in regard to an issue, concept, theory or phenomenon*" (p. 74). Carrying out a literature review has three purposes: contextualizing the research question, demonstrating the knowledge of the subject presented in the study is up to date and enabling the readers to find the original publications that are cited (Saunders et al., 2016).

A structural approach was adopted to make sure the literature review supported the premise of this study. Searches for relevant literature were done in several databases. First and foremost, Google Scholar was used. Google Scholar proved to be a very voluminous and extensive database, however it offered various ways to filter the search results to make sure that only relevant articles would show up, and there was no need to scroll through hundreds of pages of results. Secondly, the online library of Open University was used. Although this is a library with a more limited offer, it proved to be very resourceful when interspersed with search queries in Google Scholar.

When entering relevant keywords into the databases, several rules of thumb were taken into account. First of all, definition was key: searching for "co-evolutionary information systems alignment" or "COISA" did not prove to be very effective (only twelve results in Google Scholar and three results in the Open University Library), but this does not mean that no one has ever studied this subject. On the other hand, solely searching for keywords such as "alignment", "public sector" or "information systems" would serve you with a multitude of articles resulting in no longer being able to see the forest for the trees (i.e. searching for "alignment" showed over four million results in Google Scholar). Moreover, when looking for literature that is written on business IT alignment, most articles that appeared in the results were written about organizations in the private sector, while this study focuses on the public sector.

The aim of the search query was to combine keywords related to IS alignment with terms characterizing organizations in the public sector in a pragmatic but valuable matter. Examples of keywords used for different searches are: "alignment public sector", "complex public organization", "technology public sector", "business it alignment public" and "public sector information systems alignment". As demonstrated, in most of the search queries a keyword that described the public sector was combined with a keyword that depicted technical terms relevant to this research. However, in some of the search queries the focus was on the complexity of public organizations or the (dynamic) capabilities of public organizations were explored. These searches were carried out to underscore the general impact of dynamic capabilities on (public) organizations. To find more articles discussing dynamic capabilities, a snowball method was employed: bibliographies of three main articles on

dynamic capabilities were used to find other relevant titles on the subject.

Initially, the search queries were aimed at articles with keywords that occurred in the abstract, introduction and conclusion. To broaden the body of literature that was found, contents of the full text of articles were included in the search as well. The articles found were considered as the baseline of key articles and proved to be essential for the next part of the literature review.

2.2. Implementation

Relevant literature was read and administered in a Microsoft Excel file, where parts of the abstract and conclusion were added and the most significant parts of the articles were rewritten in the researcher's own words. When used in this research, articles were immediately referenced in APA style and added to the bibliography at the end of the thesis. Moreover, these articles were marked in the Excel file to keep track of what parts of the literature were used in this study.

Around 35 articles were found and thoroughly read, and to decide whether an article should be included its relevance, value and sufficiency were tested by asking the following questions (Saunders et al., 2016, p. 105):

- ⇒ Did the research question in the article led to an answer or conclusion that discussed (co-evolutionary IS) alignment, dynamic capabilities or organizational performance?
- ⇒ Does the article provide guidance for future research on (co-evolutionary) alignment, dynamic capabilities or organizational performance?
- ⇒ When reading the new items, can authors and ideas from other items be recognized?

In addition, relevant citations were viewed as an important directive in the search for related literature. Of all the articles found, 29 articles have been used in this study: some to introduce the reader to the subject matter, others to set the scope of this study or elaborate on the theoretical framework that guides the research. The results of the theoretical literature review are schematically presented in a table in Appendix A.

2.3. Results and conclusions

In this study, the operationalization of COISA initiates with the following definition of alignment: *"alignment is the continuous process, involving management and design sub-processes, of consciously and coherently interrelating all components of the business-IT relationship in order to contribute to the organisation's performance over time"* (Amarilli et al., 2017, p.3). This definition is chosen because it touches upon three important aspects of alignment that together construct the concept COISA: alignment (1) is a dynamic and continuous process, (2) consists of three elemental competencies and, within the business-IT relationship, (3) co-evolves with the organization.

Co-evolutionary Information Systems Alignment (COISA)

First of all, this definition stresses the importance of continuity and indicates that alignment is a process - not an end state that can be achieved: "[alignment] *is a continuous pursuit that needs to get continuous attention to be pursued adequately*" (Walraven, 2019b). Moreover, the second part of Amarilli et al.'s definition of alignment (2017) underlines that the process of alignment involves management sub-processes and coherently interrelates all components of the business-IT relationship, indicating the multidisciplinarity of alignment. This multidisciplinarity was integrated in this study by the use of three different levels of alignment that together compose the construct alignment competencies.

Benbya and McKelvey (2006) consider their view of Business IS alignment as a series of

modifications at three levels of analysis: individual, operational, and strategic. In the video 'Mini-instruction Co-evolutionary IS alignment' (2019b), Walraven defines an alignment competency as "*a firm's capacity to apply IT in an appropriate and timely way, in harmony with business strategies, goals and needs*" and defines alignment competency on three slightly different levels, where the (1) strategic alignment competency is focusing on alignment competency at the organizational level, the (2) operational alignment competency is focusing on alignment competency at operational levels (in business processes, working processes, routines, etc.) and the (3) IS orchestration alignment competency is meant to ensure coherence between different IS, processes, roles and functions in the organization. These three levels were incorporated in the conceptual framework guiding this research and will return in the analysis of the concept COISA and its impact on dynamic capabilities.

Lastly, the definition of alignment underscores the interrelations of all components of the business-IT relationship (Amarilli et al., 2017). The concept of COISA not only emphasizes the importance of these interrelations, but also extends on this comprehension of alignment by stating that business and IT exist in a co-evolutionary relationship. Moreover, current study shares Wetering, Mikalef and Pateli's belief (2017) that "*alignment might be conditioned to certain contextual and organizational elements*" (p. 1479). This theory of alignment was reflected in the conceptual framework of COISA by means of two moderating variables. *Interconnections between heterogeneous employees* and *Alignment motivation* are part of the concept COISA and serve as two variables that are expected to moderate the impact of alignment competencies.

The interconnections between heterogeneous employees represent the IS stakeholders. To reach interconnections between heterogeneous employees, broad stakeholder representation should exist within and between the alignment competencies, formal and informal connections between stakeholder groups, departments and roles should be present and supporting tools facilitating these interconnections should be accessible (Walraven, 2019b).

Reich and Benbasat (2000) argue that a shared domain knowledge affect both the communication between IT and business executives and the connections between business and IT planning, which in turn will influence (the social dimension of) alignment. Moreover, case studies of six public sector organizations in Australia show that social processes are significant for alignment (Martin, Gregor & Hart, 2005). In this research, social alignment mechanisms include "*overt management support for IS, the processes used in business planning for IS and the communication of plans*" (Martin et al., 2005, p. 28). Overt management support for IS can be seen as a form of IS motivation and was, although in a slightly different matter, incorporated in this conceptual framework as well. The alignment motivation describes "*the motivation that these stakeholders have to co-evolve in their interactions toward a better degree of alignment between them*" (Walraven, 2019b). Essentially, alignment motivation can be seen as a reason for IS stakeholders to co-evolve with each other toward alignment and can be an intrinsic motivation, but can also arise from misalignment demanding action or from a perception of IS importance by executive management (Walraven, 2019b).

In addition, the view of Benbya and McKelvey (2006) was used, who explain alignment as something that draws and builds on complexity theory and "[…] *its focus on coevolution-based self organized emergent behaviour and structure, which provides important insights for dealing with the emergent nature of IS alignment*" (p. 1).

Dynamic capabilities

Apart from mentioning the important dynamic, continuous and multidisciplinary elements in their definition of alignment, Amarilli et al. (2017) also acknowledge the impact of alignment on the

organization's performance. Although the organization's performance is not part of the concept COISA, dynamic capabilities are part of the conceptual framework as a whole and can be positively associated with organizational performance (Yu Yuan Hung, Chung & Ya-Hui Lien, 2007).

Apart from Yu Yuan Hung et al. (2010), more literature argues that organizational process alignment is positively associated with dynamic capabilities or competitive firm performance (Yu Yuan Hung, Chung & Ya-Hui Lien, 2007; Wetering, Mikalef & Pateli, 2017; Wilden et al., 2013). Moreover, Yu Yuan Hung et al. (2010) conceptualize organizational process alignment as a three-dimensional construct that includes structural alignment, strategic alignment and IT alignment, and state that "*organizational process alignment, namely structure alignment, strategic alignment, and IT alignment, is an antecedent to organizational performance and dynamic capability*" (p. 287).

Hypotheses and conceptual model

Walraven et al. (2018) state that "[…] *BITA is not an end-state because the mentioned strategies, goals and needs are in constant change due to environmental turbulence*" and write that "*COISA extends this notion of BITA by focusing on the co-evolutionary alignment activities*" (p. 3). This view of COISA complements the definition used in this research, representing COISA as "*continuously exercised operational, orchestrational and strategic alignment competencies characterized by co-evolution between different IS stakeholders in pursuit of Business-IT alignment*" (Walraven, 2019a). As mentioned in the last section regarding dynamic capabilities, Yu Yuan Hung et al. (2010) view structural alignment, strategic alignment and IT alignment as essential elements that have to emerge before organizational performance or dynamic capability can occur (p. 287). Putting Walraven's definition of COISA (2019a) and the view of Yu Yuan Hung et al. (2010) on the impact of alignment competencies on dynamic capability together, it is expected that continuously exercised operational, strategic and IS orchestration alignment competencies in pursuit of business-IT alignment will have a positive impact on dynamic capabilities. The first hypothesis is formulated as follows:

H1. Operational, strategic and IS orchestration alignment competencies have a positive impact on dynamic capabilities.

Cui and Jiao's research on the mediating role of stakeholder alliances (2011) concluded that "*the influence of technological flexibility capability on sustainable competitive advantage is partially mediated by strategic alliance with stakeholders*". This is why, in this study, the moderating variable *Interconnections between heterogeneous employees* is expected to have a positive influence on dynamic capabilities. This brings us to the second hypothesis:

H2. Interconnections between heterogeneous employees moderate the effect of alignment competencies on dynamic capabilities in a positive way.

Although the studies mentioned in the section regarding COISA (Reich & Benbasat, 2000; Martin et al., 2005) are relevant to recognize and elaborate on the social dimension in alignment, these studies endorse the belief that social factors directly affect alignment. However, in this research these social factors are expected to have a moderate effect on the impact of alignment on dynamic capabilities. As a moderating variable, alignment motivation serves as an important key in the conceptual model and leads to the last hypothesis that will be used to answer the research question of this study:

H3. Alignment motivation moderates the effect of alignment competencies on dynamic capabilities in a positive way.

The critical and theoretical literature review has lead to the conceptual model depicted as Figure 2.1 and presents the before mentioned hypotheses in red. In this model, the concepts shown within the box represent COISA: alignment competencies is comprised of the operational alignment competencies focusing on alignment at operational levels (processes, routines, etc.), strategic alignment competencies concentrating on alignment at the organizational level and IS orchestration alignment competencies ensuring coherence between these two alignment competencies and the different IS involved in these operational and organizational activities (Walraven, 2019b). Since, in this model, IS orchestration represents coherence between IS, this alignment competency is put between the strategic and operational alignment competencies.

As these alignment competencies are being exercised continuously, co-evolution exists between the different IS stakeholders: within the concept COISA, *Interconnections between heterogeneous employees* and *Alignment motivation* represent the IS stakeholders (and their pursuit in reaching alignment), and emphasize the evolutionary character of COISA.

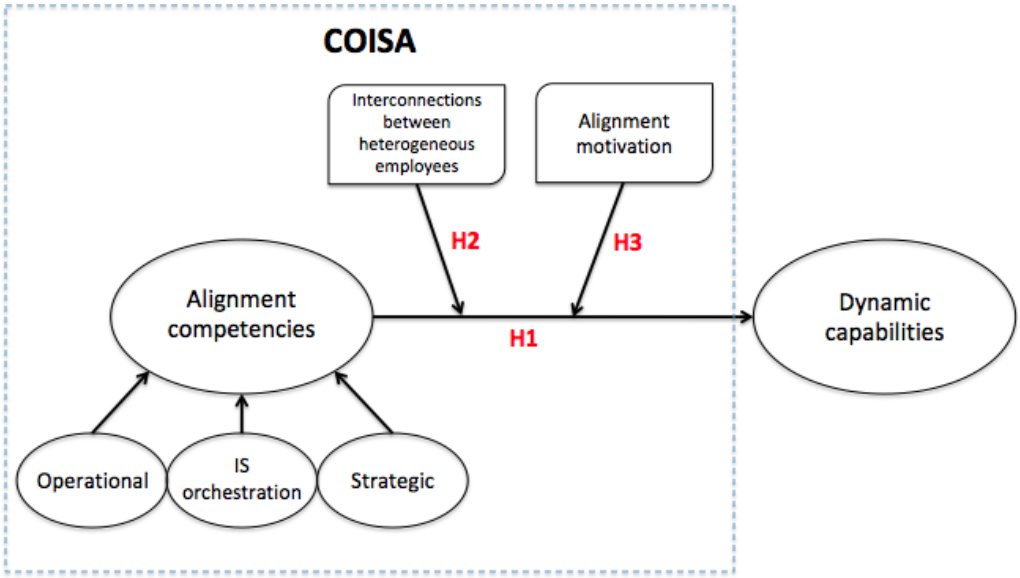

Figure 2.1: Conceptual model of this research, including the three hypotheses

2.4. Objective of the follow-up research

The purpose of the study is to employ a survey to investigate whether co-evolutionary IS alignment has an impact on the dynamic capabilities of organizations in the public sector. The target group of this study was aimed at Dutch public organizations.

Practically, this research could help public organizations to acquire internal and external competences to become more resilient in rapidly changing environments (Teece, Pisano & Shuen, 1997, p. 516) and give them the capacities to send and seize opportunities (Teece, 2007). Considered from an academic point of view, COISA can be viewed as a rather new conceptualization of an approach to business and IT alignment that has been around for a while. However, perceiving information systems (IS) as a socio-technical system and placing it in the context of the public sector, this study finds itself in a research field that has hardly been utilized before and needs follow-up research for further development.

3. Methodology

The methodology of this study is explained in chapter three: first, the research design is set out which is followed by the research method describing the approach to the data collection and the intended sample size. The way in which the data analysis is conducted is outlined in the third section. This chapter is concluded by the fourth section, which focuses on the measures taken to reach validity and reliability.

3.1. Research design

The research question that will be central to this study is:

What is the impact of co-evolutionary IS alignment on the dynamic capabilities of organizations in the public sector?

To test the three hypotheses that will guide the research, a quantitative research design was chosen. The advantage of quantitative research is that hypotheses can be tested (Saunders et al., 2016). Additionally, when testing relationships between variables and hypotheses, quantitative research is the most suitable. Examining a large group of research units will mean that the results can be generalized to a larger population (Saunders et al., 2016): in the case of this study, the results could be generalized to Dutch public organizations.

To answer the research question, the relationship between co-evolutionary IS alignment and dynamic capabilities was tested. For this research a positivistic approach was applied: positivistic research concentrates on measurable facts and observation and fitted this study because it measured the (amount of) influence of COISA on dynamic capabilities, rather than observing or interpreting the meaning of the relation (Saunders et al., 2016).

Since the exploration of the relationship between COISA and dynamic capabilities was central to this study and this meant that current study moved from generalized principles to a true and specific conclusion on the effect of COISA on dynamic capabilities, deductive reasoning was used (Saunders et al., 2016). The study was set up in a cross sectional matter, meaning that the research studied a particular phenomenon and took place at a particular time (Saunders, 2016).

3.2. Research method

The variables that were researched in this study could be distinguished in dependent and independent variables. The independent variable in this research was alignment competencies (strategic, IS orchestration and operational) and the dependent variable in this study was dynamic capabilities. As mentioned in the hypotheses, *Interconnections between heterogeneous employees* and *Alignment motivation* were moderating variables: these variables were expected to have a moderating effect on the impact of alignment competencies on dynamic capabilities.

Survey

The research method chosen for the data collection in this quantitative research was to conduct a survey, and focused on specific relationships between variables. The survey consisted of questions and was measured on a seven-point Likert scale, meaning that respondents were asked how strongly they agree or disagree with the statement by scoring on a seven-point rating scale. The language of the survey was English and the survey is included in Appendix B.

The survey was set up to measure the relationships between the variables that were mentioned in the hypotheses. To assess the validity of the survey, the questions were tested in a Q-sorting session (Nahm, Rao, Solis-Galvan & Ragu-Nathan, 2002). During this Q-sorting session, participants were asked to distribute the questions over the COISA concepts they thought the questions theoretically belonged to. Participants could choose between strategic alignment competency, orchestrational alignment competency, operational alignment competency, interconnections between heterogeneous employees and alignment motivation.

The measurement model of dynamic capabilities introduced by Janssen et al. (2016) is used to operationalize dynamic capabilities in the survey and includes four reflective indicators: (1) Sensing user needs and (technological) options, (2) Conceptualizing corresponds to capabilities essential for taking an idea to cultivate it into a detailed proposition, (3) (Co)producing and orchestrating and (4) Scaling and stretching (p. 3-5). This framework suited the study well because it is focused on dynamic capabilities as learning, adapting and service innovation capabilities. Moreover, since this study concentrated on organizations in the public sector, it was essential to this study that the framework established by Janssen et al. (2016) avoided operationalization of organizational performance as being profitable. Lastly, Janssen et al. (2016) state that the dynamic capabilities framework they developed builds on evolutionary theorizing (p. 11), indicating the framework's suitability to the operationalization of dynamic capabilities in this research even more.

Sample technique and sample size

The survey was distributed digitally and respondents were able to fill out the survey in the online survey tool LimeSurvey. Although the downside of a digital survey was that the survey looked different on the respondents' device than it did on the device of the researcher, testing the survey on several devices and in several Internet browsers easily surpassed this disadvantage.

In the case of this study, non-probability sampling was used since the probability of each respondent being selected from the target population was not known (Saunders et al., 2016). First of all, respondents were approached on a voluntary basis using the volunteer sample technique. Since this happened through a LinkedIn message on the researcher's timeline asking to fill out and share the survey, the volunteer sample was of a self-selection type and had a small snowball effect when people forwarded the message to their own connections on LinkedIn. At the same time, this could be regarded as a convenience type of sampling: this haphazard sampling technique meant that the survey was distributed amongst the researcher's network of connections. Since the above-mentioned types of sampling were not sufficient, sending out emails was another way to reach respondents. Since self-selection and convenience sampling were used to find the respondents for this study, generalization of the findings lacked credibility.

Considering that the questions in this survey were directed towards IT professionals and were written in the idiom that fitted this professional discipline, only surveys that were completed by IT professionals who work for Dutch public organizations were included in this study. Respondents were asked to fill out their role within the organization to determine whether the respondent fitted the IT professional profile. When surveys that were not completed by IT professionals who work in the Dutch public sector were included in the study, it would reduce the validity of the research. Lastly, the goal of this study was to examine public organizations. This means that, essentially, only one completed survey per public organization was allowed in the data collection. However, since a lot of IT professionals from large governmental bodies participated in the study, in some cases surveys of the same public organization were allowed in the data collection (when, for example,

surveys were filled out by IT professionals employed at the same Ministry but who were clearly working at totally different departments).

When executing a quantitative research, normally a 95 percent level of certainty is used (Saunders et al., 2016, p. 280). This study was executed by a research team that consisted of four researchers and strived for a minimum sample size of 80 to 100 respondents in total, which meant that every researcher was responsible for 20 to 30 respondents. Using the calculation provided by Saunders et al. (2016, p. 283) and keeping a 15% digital survey response rate in mind, this meant that the actual sample should have been 100 x 100 / 15% = 666 respondents. Although the actual sample was hard to track, LinkedIn direct messaging and posting requests on our timeline alone already reached over 4000 people. Unfortunately, it is not clear how many of those people were in fact IT professionals currently employed in the public sector. Ultimately, since it proved to be very hard to reach the target group and arrive at the sample size of 80 to 100 respondents in total, the coordinator of the research team employed her professional network and emailed contacts in her professional community directly. This proved to be very helpful and ensured that the sample size grew from 68 to 86 respondents.

3.3. Data analysis

For this study, the Partial Least Squares Based Structural Equation Modeling (PLS-SEM) was employed to analyze the collected data. PLS-SEM is a causal-predictive approach to Structural Equation Modeling that focuses on prediction in estimating statistical models and is used by researchers to estimate complex models with many constructs, indicator variables and structural paths (Hair, Risher, Sarstedt & Ringle, 2018). The software SmartPLS (v. 3.2.9) was used to analyze the data, evaluate the structural model and assess the hypotheses posed to answer the research question leading this study (Ringle, Wende & Becker, 2015).

PLS-SEM was selected for the data analyses in this study because of several reasons: firstly, the analysis was concerned with testing a theoretical framework from a prediction perspective; secondly, the path model included two formatively measured constructs (namely, alignment competencies and dynamic capabilities); moreover, the study concerned exploratory research for theory development regarding COISA; and lastly, the small population chosen for this study (IT professionals active in the Dutch public sector) restricted the sample size (Hair et al., 2018, p. 5). According to the specific particularities of this study mentioned above, employing PLS-SEM by using the SmartPLS software was very suitable for the data analysis of this research (Hair et al., 2018).

3.4. Validity, reliability and ethical aspects

To set up this study so that it would allow for obtaining valid and reliable results, various measures were taken into account. As mentioned before, although conducting a survey is a reliable method to assess the hypotheses in this study, the sample techniques used would not allow generalization of the findings to a large population. In a pre-testing stage of the research, a Q-sort session took place to assess reliability and construct the validity of the survey (Nahm et al., 2002).

Saunders et al. (2016) refer to ethics as "*the standards of behaviour that guide your conduct in relation to the rights of those who become the subject of your work, or are affected by it*" (p. 239). This means that there are several aspects to take into account when conducting this research.

Integrity and objectivity

To make sure that the respondents received the survey as an objective and informative questionnaire, questions were all written in English and were clearly formulated. To increase reliability and reduce the level of possible miscommunication to a minimum, every question could be answered with the same seven-point Likert-scale. Before respondents started filling out the survey, the goal of the study was clearly communicated and it was emphasized that this research had no intention to pursue commercial interests.

Respect and voluntary participation

The sample technique that was used assured that the respondents' participation was completely voluntary. Respondents were treated with respect and if, during the completion of the survey, a respondent would like to suspend participation, this was by all means possible and all entered information would have been deleted.

Privacy

To make sure the privacy of the respondents was protected, no personal information was requested in the survey except for some limited professional information; respondents were asked to fill out their role within the organization to determine whether the respondent was in fact an IT professional. When, due to the low response rate, respondents were emailed to ask them to participate in the survey, email addresses were in no way used to violate the anonymity of the respondents. Only the name of the company was of interest, to make sure that the data collected would not contain duplicates.

4. Results

In this chapter, the collected data was used in several analyses. Firstly, the data collected and the response rate will briefly be discussed. Then, in the first section, the first - and second order constructs in the path model are explained. This leads to the next section, where the reflective measurement models are assessed on their convergent validity, internal consistency reliability and discriminant validity. In the third section, collinearity between indicators and significance and relevance of outer weights of the formative measurement models are tested. An evaluation of the structural model was conducted in section four, by examining the coefficient of determination (R^2), size and significance of path coefficients and the predictive relevance (Q^2) and effect sizes (q^2). Lastly, the hypotheses were tested and moderator analyses were conducted and are visually depicted by simple slope plots (Figure 4.2 and Figure 4.3).

The survey delivered 86 complete responses and 104 incomplete responses. Since, out of the 104 incomplete responses, there were no surveys that had a reasonable amount of missing values, none of the incomplete surveys could be taken into account and only the complete responses were included. Of the 86 completed surveys, two were deleted: one Fortune 500 response was deleted (there were no indications of this company being active in the public sector) and one response of an Australian University was deleted considering the fact that this study focused on Dutch organizations in the public sector. In the 84 responses left, duplicates were found: this meant that, in some cases, an organization was represented more than once. For the sake of the response rate, which was not that large due to the limited data collection time span, these responses were included in the data analyses. Figure 4.1 shows the distribution of respondents among various professional categories.

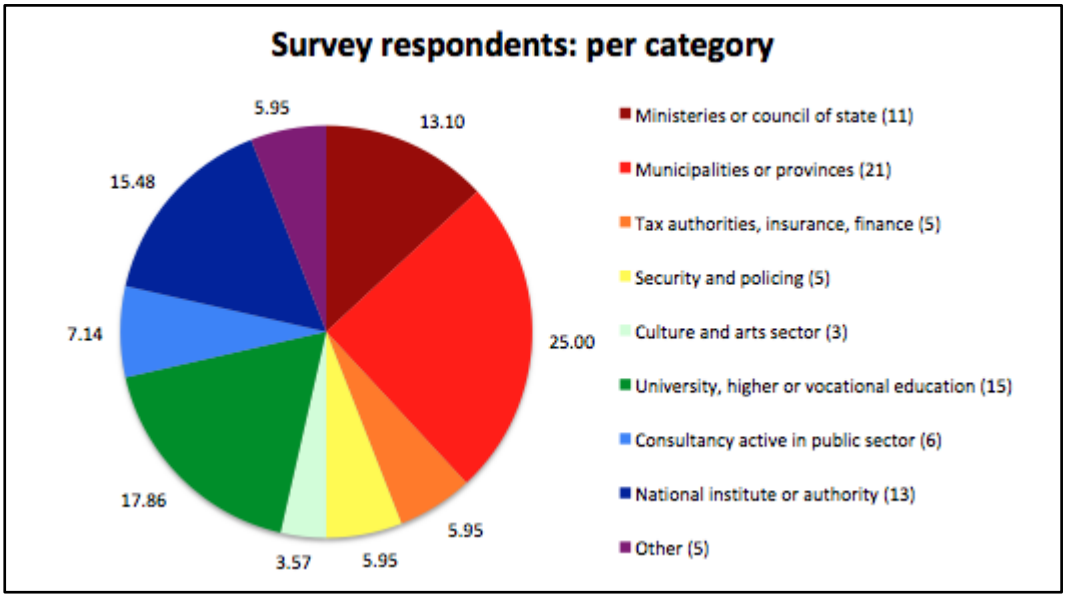

Figure 4.1: Distribution respondents among categories.

4.1. Type Two constructs

The path model used to analyze the gathered data and to assess the hypotheses established in chapter 2 (Theoretical Framework) consists of two Type Two constructs: Alignment Competencies (ALCOMP) and Dynamic Capabilities (DYNCAP). These Type Two constructs consist of reflective first-order constructs: ALCOMP consists of reflective first-order constructs *IS Orchestration* (ISORCH),

Operational (OPER) and *Strategic* (STRAT). The second Type Two construct DYNCAP consists of *Sensing user needs and (technological) options* (SENSING), *Coproducing and Orchestrating* (COPRORCH), *Conceptualizing* (CONCEP) and *Scaling and Stretching* (SCALESTRETCH). These reflective first-order constructs compose the second order constructs in a formative way, confirming that the Type Two constructs ALCOMP and DYNCAP are reflective-formative type Hierarchical Component Models (Hair et al., 2017, Ch. 8, p. 12). In Table 4.1, the indicators, first-order and second-order constructs are depicted. The Type Two constructs Alignment Competencies and Dynamic Capabilities serve as the higher-order constructs (HOCs), while the reflective first-order constructs in the second column present the lower-order constructs (LOCs). In the next section, the reflective measurement models will be assessed, following by the assessment of the Hierarchical Component Model in section 4.3.

Type Two (second-order) construct	Reflective first-order construct	Indicators
Alignment Competencies (ALCOMP)	IS Orchestration (ISORCH)	ORCH1, ORCH2, ORCH3, ORCH4
	Operational (OPER)	OP1, OP2, OP3, OP4
	Strategic (STRAT)	STR1, STR2, STR3, STR4
Dynamic Capabilities (DYNCAP)	Sensing user needs and (technological) options (SENSING)	Sensing1, Sensing2, Sensing3, Sensing4, Sensing5, Sensing6
	Coproducing and Orchestrating (COPRORCH)	CoprOrch1, CoprOrch2
	Conceptualizing (CONCEP)	Concep1, Concep2, Concep3
	Scaling and Stretching (SCALESTRETCH)	ScaleStretch1, ScaleStretch2, ScaleStretch3
	Alignment Motivation (ALMOT)	MOT1, MOT2, MOT3, MOT4
	Interconnections between Heterogeneous Employees (INTHETEMP)	INT1, INT2, INT3, INT4

Table 4.1: Type two constructs and reflective first-order constructs with corresponding indicators.

4.2. Assessment of reflective measurement models

In the following section, we address each criterion for the evaluation of reflective measurement models. The constructs (variables) that are measured consist of various indicators, so in order to evaluate the measurement model several validity and reliability analyses have been performed. In this assessment of the reflective measurement model, composite reliability and Cronbach's alpha are used to evaluate the internal consistency reliability of the measurement model. Assessments of the outer loadings, individual indicator reliability and average variance extracted (AVE) were employed to evaluate convergent validity. To complete the assessment of reflective measurement models, discriminant validity was included as well. Although the Fornell-Larcker criterion and assessment of the cross-loadings are widely applied to examine discriminant validity in marketing (Hair et al., 2012a) and strategic management (2012b), by conducting a simulation study Henseler, Ringle and Sarstedt (2015) found that the Fornell-Larcker criterion and the assessment of the cross-loadings fail to reliably uncover discriminant validity problems in variance-based SEM. Henseler et al. (2015) propose the heterotrait-monotrait ratio of correlations (HTMT) as a new approach to assess discriminant validity in variance-based SEM, which will also be used to evaluate discriminant validity in this measurement model.

A table summarizing the results for the Reflective Measurement Models is depicted on the next page; in this section only deviations are addressed. The Type Two constructs are not included in the evaluation of the measurement model but will be evaluated in the next section: 4.3. Assessment of Hierarchical Component Model (HCM).

Latent variable	Indicators	Convergent validity			Internal consistency reliability		Discriminant validity
		Loadings	Indicator reliability	AVE	Composite reliability	Cronbach's alpha	
		>0.70	>0.50	>0.50	0.60-0.90	0.60-0.90	HTMT confidence interval does not include 1
ISORCH	ORCH1	0.876	0.767	0.804	0.942	0.918	Yes
	ORCH2	0.852	0.726				
	ORCH3	0.919	0.845				
	ORCH4	0.936	0.876				
OPER	OP1	0.831	0.691	0.641	0.877	0.813	Yes
	OP2	0.737	0.543				
	OP3	0.851	0.724				
	OP4	0.778	0.605				
STRAT	STR1	0.897	0.805	0.772	0.931	0.901	Yes
	STR2	0.875	0.766				
	STR3	0.881	0.776				
	STR4	0.861	0.741				
INTHETEMP	INT1	0.876	0.767	0.712	0.908	0.864	Yes
	INT2	0.870	0.757				
	INT3	0.864	0.746				
	INT4	0.760	0.578				
ALMOT	MOT1	0.886	0.785	0.820	0.948	0.927	Yes
	MOT2	0.914	0.835				
	MOT3	0.917	0.841				
	MOT4	0.904	0.817				
CONCEP	CONCEP1	0.899	0.808	0.753	0.901	0.836	Yes
	CONCEP2	0.871	0.759				
	CONCEP3	0.831	0.691				
COPRORCH	CoprOrch1	0.892	0.796	0.825	0.904	0.790	Yes
	CoprOrch2	0.925	0.856				
SCALESTRETCH	ScaleStretch1	0.849	0.721	0.786	0.917	0.864	Yes
	ScaleStretch2	0.888	0.789				
	ScaleStretch3	0.921	0.848				
SENSING	Sensing1	0.726	0.527	0.540	0.875	0.828	Yes
	Sensing2	0.668	0.446				
	Sensing3	0.626	0.392				
	Sensing4	0.723	0.523				
	Sensing5	0.846	0.716				
	Sensing6	0.800	0.640				

Table 4.2: Results summary for Reflective Measurement Models.

Convergent validity

Hair et al. write that "*For the reflective measurement models, we need the estimates for the relationships between the reflectant latent variables and their indicators*", i.e. the outer loadings (Hair et al., 2017, Ch. 4 p. 31). On the next page, Table 4.2 shows that the values of the outer loadings of indicators Sensing2 and Sensing3 are slightly below the threshold of 0.7 (respectively 0.668 and 0.626). However, deleting the indicators Sensing2 and Sensing3 and executing the analysis again showed a decreased value for the outer loading of Sensing1 (0.656). So since the outer loadings of Sensing2 and Sensing3 are near the threshold of 0.7 and since it is important to keep the initial value of the outer loading of indicator Sensing1 (0.726), it is decided to keep all these indicators in the analysis. According to Hulland (1999), although 0.70 or higher is preferred when assessing outer loadings, if it concerns an exploratory research, 0.4 or higher is acceptable. Based on this threshold, all indicators can be preserved.

"*The square of a standardized indicator's outer loading represents how much of the variation in an item is explained by the construct and is described as the variance extracted from the item*" (Hair et al., 2017, Ch. 4, p. 15). A latent variable should explain a substantial part of each indicator's variance, usually at

least 50%, meaning that the indicator's reliability should be > 0.50. As depicted in table 4.2, all the values of indicator reliability of the reflective constructs are above the threshold value of 0.50, except for indicator Sensing2 (0.446) and Sensing3 (0.391). This is why, to confirm that the constructs explain more than half of the variance of its indicators, the AVE values were assessed as well (Hair et al., 2017, Ch. 4, p. 17). The outcome shows that AVE values of all the constructs are above the required minimum level of 0.50, with values between 0.540 (SENSING) and 0.825 (COPRORCH).

Internal consistency reliability

The, rather traditional, criterion used to measure internal consistency is Cronbach's alpha, which "*provides an estimate of the reliability based on the intercorrelations of the observed indicator variables*" (Hair et al., 2017, Ch. 4, p. 12). After assessing the measure, all the Cronbach's alphas of the reflective constructs are well above the threshold value of 0.70, with values between 0.790 (COPRORCH) and 0.927 (ALMOT).

But where Cronbach's alpha assumes that all indicators are equally reliable, PLS-SEM prioritizes the indicators according to their individual reliability. Moreover, Hair et al. (2017) write: "*Cronbach's alpha is sensitive to the number of items in the scale and generally tends to underestimate the internal consistency reliability*" (Ch. 4, p. 12-13). Due to Cronbach's alpha's limitations, Hair et al. (2017) find it technically more appropriate to apply composite reliability to measure the internal consistency reliability that takes into account the different outer loadings of the indicator variables. Composite reliability is generally interpreted in the same way as Cronbach's alpha, where values of 0.60 to 0.70 are acceptable in exploratory research (Hair et al., 2017, Ch. 4, p. 13). All the values of composite reliability of the reflective constructs are well above the threshold value of 0.70, with values between 0.875 (SENSING) and 0.948 (ALMOT). However, values above 0.90 (certainly above 0.95) are not preferable because "*they indicate that all the indicator variables are measuring the same phenomenon and are therefore not likely to be a valid measure of the construct*" (Hair et al., 2017, Ch. 4, p. 13). After taking a closer look at the items that assemble the indicators that have a composite reliability value that is 0.9 or higher (ISORCH, STRAT, INTHETEMP, ALMOT, CONCEP, COPRORCH, SCALESTRETCH), there seem to be no semantically redundant items that could be deleted to improve the composite reliability. All the items actually seem to measure different aspects of the construct domain, so this is why all items and indicators are kept in the analysis.

Discriminant validity

Establishing the discriminant validity of the constructs used in this study implies that these constructs are unique and capture phenomena not represented by the other constructs in the model (Hair et al., 2017, Ch. 4, p. 17). As mentioned before, we assessed the discriminant validity by looking at the Heterotrait-Monotrait ratio (HTMT), using 0.85 as the relevant threshold level. Table 4.3 depicts the HTMT values of all the constructs and shows that all the HTMT values are below the conservative threshold level of 0.85. Additionally, it was tested whether the HTMT values are significantly different from 1 by using a bootstrapping procedure. Table 4.2 depicts that none of all the constructs include 1, confirming the discriminant validity of the first order constructs once more.

	ALMOT	CONCEP	COPRORCH	INTHETEMP	ISORCH	OPER	SCALE STRETCH	SENSING	STRAT
ALMOT									
CONCEP	0.670								
COPRORCH	0.518	0.689							
INTHETEMP	0.762	0.651	0.711						
ISORCH	0.540	0.631	0.668	0.662					
OPER	0.563	0.633	0.580	0.684	0.549				
SCALESTRETCH	0.251	0.583	0.544	0.497	0.367	0.433			
SENSING	0.523	0.758	0.725	0.743	0.726	0.734	0.654		
STRAT	0.562	0.691	0.741	0.808	0.755	0.730	0.464	0.823	

Table 4.3: Heterotrait-Monotrait values, using 0.85 as threshold level.

4.3. Assessment of Hierarchical Component Model (HCM)

Collinearity between indicators

Following the structural model assessment procedure depicted by Hair et al. (2017, Ch. 6, p. 3), first, the model needs to be checked for collinearity issues by examining the VIF values of all sets of the lower-order components (LOCs) in the hierarchical component model (HCM).

Lower Order Components (LOCs)	VIF Value
CONCEP	1.980
COPRORCH	1.781
ISORCH	1.911
OPER	1.684
SCALESTRETCH	1.438
SENSING	2.165
STRAT	2.461

Table 4.4: VIF Values of Lower Order Components (LOCs).

As can be seen in Table 4.4, all VIF values were not only below the threshold of 5 but even below the more conservative threshold of 3. Therefore, collinearity among the lower-order constructs was not a critical issue in the hierarchical component model, and the examination of the results report is continued.

Significance and relevance of outer weights

To assess the significance of the outer weights, a Bias-Corrected and Accelerated (BCa) Bootstrap was employed. By taking the construct's indicator weights into consideration, the relative importance of the specific elements was identified (Hair et al., 2017). The indicators STRAT (0.496) and SENSING (0.489) are revealed as the highest outer weights, meaning that *Strategic Alignment Competencies* and *Sensing user needs and (technological) options* play a relatively important part in comparison to the other lower order constructs, when assessing the Type Two constructs Alignment Competencies and Dynamic Capabilities.

Secondly, the absolute importance was tested by looking at the p-values (i.e., probability values). The p-values in the formative relations must be lower than 0.05 to establish significant outer weights at a significance level of 5% ($\alpha = 0.05$) (Hair et al., 2017, Ch. 5, p. 69). As depicted in Table 4.5, the p-values of the formative relations are all below 0.05, except for the construct SCALESTRETCH (0.824), which might be due to the relatively small sample size of 84 respondents. Hair et al. (2017) write that "[w]*hen an indicator's outer weight is nonsignificant but its outer loading is high (i.e., above 0.50),*

the indicator should be interpreted as absolutely important but not as relatively important" (Ch. 5, p. 19). Since the outer loading of SCALESTRETCH is 0.532, it was decided to retain the indicator.

Formative relations	p-value
ISORCH > ALCOMP	0.001
OPER > ALCOMP	0.014
STRAT > ALCOMP	0.000
CONCEP > DYNCAP	0.000
CORPORCH > DYNCAP	0.027
SCALESTRETCH > DYNCAP	0.824
SENSING > DYNCAP	0.000

Table 4.5: p-values of formative relations, measured with significance level of 5% ($\alpha = 0.05$).

4.4. Evaluation of structural model

The evaluation of the structural model builds on the results from the standard model estimation, the bootstrapping routine, and the blindfolding procedure (Hair et al., 2017).

Coefficient of determination (R^2)

Hair et al. (2017) state that, although the R^2 value ranges from 0 to 1 with higher levels indicating higher levels of predictive accuracy, "*it is difficult to provide rules of thumb for acceptable R^2 values as this depends on the model complexity and the research discipline*" (Chapter 6, p. 14). Whereas lower R^2 values (0.20 and higher) are considered high in success driven studies, Hair et al. (2017) explain that researchers expect much higher values, such as 0.75 and above (Chapter 6, p. 14).

The R^2 value is examined by employing the bootstrapping routine, which revealed an R^2 value of 0.687 for DYNCAP, which is not as high as one might expect for this exploratory type of research. This R^2 value is a measure of the model's predictive power and represents a substantial significant value of the exogenous latent variables' combined effects on Dynamic Capabilities (DYNCAP).

Size and significance of Path Coefficients

The path coefficient depicted in Table 4.6 is obtained through a PLS Algorithm analysis using the simplified path model, and is used to assess the path coefficient of the relation between Alignment Competencies and Dynamic Capabilities as represented in the first hypothesis.
Based on the path coefficient and t-value represented in Table 4.6, one finds that the hypothesis 1, stating that operational, strategic and IS orchestration alignment competencies have a positive impact on dynamic capabilities, is supported.

Hypothesis	Relation	Path coefficient	t-value	p-value	Decision
H1	ALCOMP > DYNCAP	0.641	6.609	0.000	Supported

Table 4.6: Significance testing results of the structural model path coefficient.
Notes: t-values and p-values are computed through bootstrapping procedure with 84 cases and 5000 samples.

Predictive relevance Q^2 and effect sizes (q^2)

Moreover, the predictive relevance (Q_2) was assessed by means of the blindfolding procedure in SmartPLS. The predictive relevance of DYNCAP (0.448) is considerably above zero. This result supports the model's predictive relevance regarding the dependent latent variable Dynamic Capabilities.

The final assessment addresses the q2 effect sizes. These must be computed manually because

the SmartPLS software does not provide them, and are determined using the following calculation (Hair et al., 2017):

$$\frac{Q^2_{included} - Q^2_{excluded}}{1 - Q^2_{included}}$$

This brings us to the following computation: q^2 ALCOMP → DYNCAP = (0.448 - 0.321) / (1 - 0.448) = 0.230. Following the rules of thumb stated by Hair et al. (2017), the q^2 effect size for the relation ALCOMP → DYNCAP can be considered medium (Chapter 6, p. 48).

4.5. Moderator analysis

In this last section, attention is devoted to a concise moderator analysis for the constructs Alignment Motivation (ALMOT) and Interconnections between heterogeneous employees (INTHETEMP). Since the two-stage approach is considered to be the most versatile approach to the moderator analysis "*as it also works when the exogenous construct and/or the moderator are measured formatively*" (Hair et al., 2017, Chapter 7, p. 64), this method was employed to automatically include an interaction term in the simplified path model.

After conducting a PLS Algorithm analysis including the moderating interaction terms MODALMOT and MODINTHETEMP, the results show that the interaction term MODALMOT (-0.057) as well as MODINTHETEMP (-0.022) have a negative effect on Dynamic Capabilities (DYNCAP), whereas the simple effect of Alignment Competencies (ALCOMP) on Dynamic Capabilities (DYNCAP) is 0.646 for an average level of Alignment Motivation of Interconnections between heterogeneous employees. Looking at the p-values (the absolute importance) of the moderating variables ALMOT and INTHETEMP, one can conclude that the moderating variables are not significant (Table 4.7).

Moderating variables	p-value
MODALMOT > DYNCAP	0.563
MODINTHETEMP > DYNCAP	0.774

Table 4.7: p-values of moderating variables, measured with significance level of 5% (α = 0.05)

This means that hypotheses 2 and 3 as cited below should both be dismissed by means of this study:

H2. Interconnections between heterogeneous employees moderate the effect of alignment competencies on dynamic capabilities in a positive way.

H3. Alignment motivation moderates the effect of alignment competencies on dynamic capabilities in a positive way.

For example, for higher levels of ALMOT (e.g. ALMOT is increased by one standard deviation point), the relationship between ALCOMP decreases by the size of the interaction term MODALMOT (i.e. 0.646 - 0.057 = 0.589). Vice versa, for lower levels of ALMOT (e.g. ALMOT is decreased by one standard deviation unit), the relationship between ALCOMP and DYNCAP will turn out to be 0.646 + 0.057 = 0.703. For a better conception and interpretation of the results of the moderator analysis, Simple Slope Analyses were generated.

The blue lines represent the relationship for an average level of the moderator variable Alignment Motivation (Figure 4.2) and Interconnections between heterogeneous employees (Figure 4.3). The green lines depict the relationship between ALCOMP and DYNCAP for higher levels of the

moderator variables (i.e., mean value of ALMOT or INTHETEMP plus one standard deviation unit) and the red line represents the lower levels of the moderator variables (i.e., mean value of ALMOT or INTHETEMP minus one standard deviation unit). As we can see in both figures, the relationship between ALCOMP and DYNCAP is positive for all three lines as indicated by their positive slope. Hence, higher levels of Alignment Competencies go hand in hand with higher levels of Dynamic Capabilities (Hair et al., 2017, Chapter 7, p. 71).

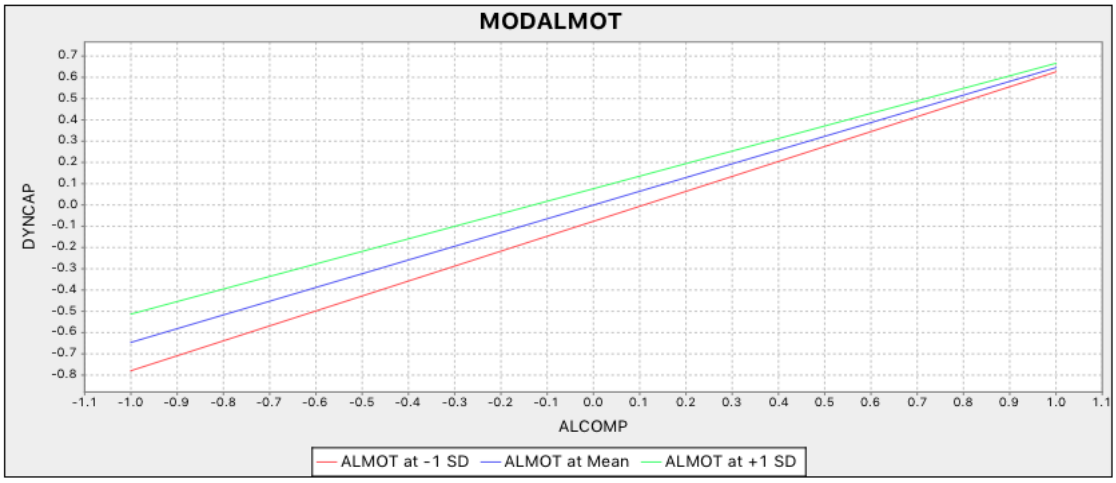

Figure 4.2: Simple Slope Plot moderator Alignment Motivation.

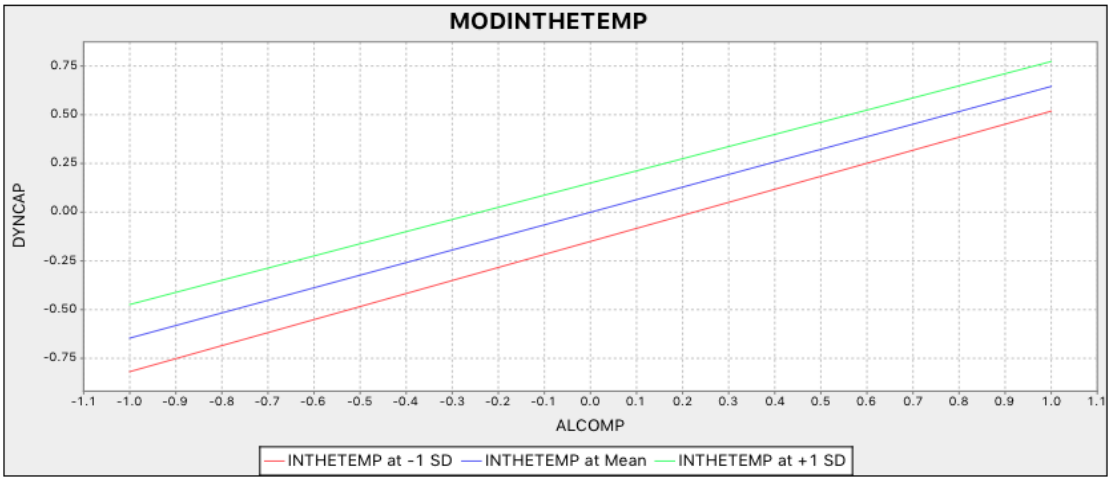

Figure 4.3: Simple Slope Plot moderator Interconnections between heterogeneous employees.

Effect sizes (f^2)

In order to complete the representation of the results, the final step of the moderator analysis addresses the moderator's f^2 effect size (Hair et al., 2017, Chapter 7, p. 74). The f^2 values show all combinations of the dependent construct Dynamic Capabilities and corresponding independent constructs. ALCOMP has a substantial effect size of 0.580 on DYNCAP. On the contrary, INTHETEMP (0.021) seemed to have a small effect on DYNCAP and ALMOT (0.008) did not seem to have an effect on DYNCAP.

5. Discussion

This last chapter is introduced with a discussion of the outcomes and a reflection of the research method. Thereafter, the meaning of the results is defined in order to compare them to previous research and to determine whether the hypotheses introduced in the second chapter should be accepted or rejected. Subsequently, the main research question of this study can be answered. The chapter concludes with recommendations for practice and future research.

5.1. Conclusions

The aim of this research was to bridge the gap between the internal and external complexity public organizations face when striving for business and IT alignment. To do so, the impact of COISA on the dynamic capabilities was examined: the construct *alignment competencies* consists of three dimensions (operational, IS orchestration and strategic), and together with the moderating role of *interconnections between heterogeneous employees* and *alignment motivation* constitutes the concept *COISA*.

To answer the research question, three hypotheses were established and a quantitative, survey-based research was conducted. By means of thorough assessments of the reflective measurement model, the Hierarchical Component Model (HCM), the structural model and a moderator analysis, these hypotheses were tested and subsequently accepted or rejected.

Based on the path coefficient and t-value represented by the results of the bootstrapping routine (Table 4.6), one finds that the first hypothesis described below is accepted.

H1. Operational, strategic and IS orchestration alignment competencies have a positive impact on dynamic capabilities.

The results support other literature previously elaborated on, which described that (organizational) alignment is positively associated with dynamic capabilities or competitive firm performance (Yu Yuan Hung, Chung & Ya-Hui Lien, 2007; Wetering, Mikalef, & Pateli, 2017; Wilden et al., 2013). In addition, this research extended on that notion by using a two-stage approach to study the three underlying competencies (operational, strategic and IS orchestration) that establish the construct *alignment competencies*, and confirms that the construct as a whole has a positive impact on *dynamic capabilities*. Furthermore, in line with the two stage approach, the outcomes correspond with the results of the study of Yu Yuan Hung et al., showing that structural alignment, strategic alignment and IT alignment are essential elements that have to emerge before organizational performance or dynamic capability can occur (2010, p. 287). However, it can be questioned whether the essential element that Yu Yuan Hung et al. (2010) used in their research is comparable to the composition of the construct alignment competencies employed in this study.

Therefore, the construction of *alignment competencies* as being comprised of operational, strategic and IS orchestration alignment competencies should be explored more extensively in further research. When researched and employed more thoroughly, the multi-deployable construct *alignment competencies* could be useful for the development of a comparative measure that could be used amongst a wide range of organizations, and could be applicable in the private sector as well as in the public sector. The more the construct is used to collect data, the more it is validated and the more it will benefit the study on co-evolutionary IS alignment.

To assess the second and third hypotheses below, a moderator analysis for the constructs *alignment motivation* and *interconnections between heterogeneous employees* was conducted, including the

significance (p-values) and effect sizes (f^2).

After conducting a PLS Algorithm analysis including the moderating interaction terms for *alignment motivation* and *interconnections between heterogeneous employees*, the results showed that the interaction terms both have a negative effect on *dynamic capabilities*. Whereas the simple effect of *alignment competencies* on *dynamic capabilities* is 0.646 for an average level of *alignment motivation* or *interconnections between heterogeneous employees*, looking at the absolute importance, one can conclude that the moderating variables are no evidence against hypotheses 2 and 3:

H2. Interconnections between heterogeneous employees moderate the effect of alignment competencies on dynamic capabilities in a positive way.

H3. Alignment motivation moderates the effect of alignment competencies on dynamic capabilities in a positive way.

Interconnections between heterogeneous employees (0.021) seem to have a small effect on *dynamic capabilities* and *alignment motivation* (0.008) has a negligible effect on *dynamic capabilities*. These results again confirm that both *interconnections between heterogeneous employees* and *alignment motivation* do not moderate the effect of *alignment competencies* on *dynamic capabilities*, and certainly not in a positive way. Although the negligible to small effect, these results seem to support the belief that, in *COISA*, social factors directly affect alignment (Reich & Benbasat, 2000; Martin et al., 2005). More research should be done to determine whether *alignment motivation* and *interconnections between heterogeneous employees* have a moderating effect or a direct effect on *dynamic capabilities*.

Moreover, the results show that when IT professionals currently employed in public organizations see internal or external *alignment motivation* as a reason to co-evolve with other IS stakeholders, this has a small negative effect on the impact of *alignment competencies* on the organization's *dynamic capabilities*. These results do not correspond with the outcome of the case studies of six public sector organizations in Australia, which demonstrates that social processes are significant for alignment (Martin, Gregor & Hart, 2005). Concluding, Cui and Jiao's research on the mediating role of stakeholder alliances (2011) is not recognized in these results either: the influence of *alignment competencies* on *dynamic capabilities* is not moderated by co-evolving alliances with stakeholders and mediation was not confirmed either.

More research should be done on the operationalization of *alignment motivation* and *interconnections between heterogeneous employees* to see how these moderating variables differ from each other and to determine if these variables are, for example, consecutively ordered. Also, more attention should be devoted on the development of the construct *dynamic capabilities*, since the absolute importance of the indicator *Scaling and Stretching* was not significant. One might consider testing the construct *dynamic capabilities* by leaving out this indicator. Overall, the items (survey questions) used to collect data on the moderating variables (*alignment motivation* and *interconnections between heterogeneous employees*) and the construct *dynamic capabilities* should be critically re-examined and tested on a larger and broader population of IT professionals.

After concluding the analyses and assessing the hypotheses, the research question of this study can be answered:

What is the impact of co-evolutionary IS alignment on the dynamic capabilities of organizations in the public sector?

This research does not reject the view that alignment builds on complexity theory, however it does not confirm the assumed self organized and co-evolutionary nature of alignment either (Benbya and McKelvey, 2006). Walraven (2019a) defined COISA as "*continuously exercised operational, orchestrational and strategic alignment competencies characterized by co-evolution between different IS stakeholders in pursuit of Business-IT alignment*", and although this study confirms that alignment competencies have a positive impact on dynamic capabilities, the co-evolutionary essence of these alignment competencies are not recognized by means of this study. Concluding, more research and usage of the variables *alignment motivation* and *interconnections between heterogeneous employees* is crucial to the development of co-evolutionary IS alignment. In the sections that will follow, the research method and practical relevance of this study will be reflected on and the limitations of the study and recommendations for further research are briefly considered.

5.2. Reflection on research method

Since not a lot of research has been done on COISA and since the exploration of the relationship between COISA and dynamic capabilities was central to this study, deductive reasoning was used to move from generalized principles to a true and specific conclusion on the effect of COISA on dynamic capabilities. When analyzing the relationship between COISA and dynamic capabilities, the modest response of 86 completed surveys was something to be cognizant of when interpreting and generalizing the results. The relatively limited response may be due to the short timespan in which data was collected (seven weeks), but can also be explained by the focus on the target audience of this study, established as Dutch public organizations, which proved to be hard to reach and less approachable than organizations active in the commercial sector.

Although the focus was on the operationalization of the constructs *alignment competencies* and *dynamic capabilities*, further research should concentrate on a concise operationalization of the moderating variables *alignment motivation* and *interconnection between heterogeneous employees* as well. The results showed that both these moderating variables were not significant and had no effect on the impact of alignment competencies on dynamic capabilities. So paying more attention to the operationalization and the specific items that are used to collect data on these variables could improve the validity of the variables and in the end might improve the results.

5.3. Limitations and recommendations for further research

As mentioned in an earlier section, higher-order constructs and lower-order constructs were used in a reflective-formative type hierarchical component model: *alignment competencies* and *dynamic capabilities* serving as the higher-order constructs and the underlying constructs serving as the lower-order constructs. In further research, focus could be on the composition of these lower-order constructs. As the analyses showed, the reliability and validity of the construct *Sensing user needs and technological options* could be improved by evaluating the survey questions. A similar recommendation could be given regarding the composite reliability, which showed very high values (0.9 or higher) for the lower-order constructs and the moderating variables. Closely evaluating the items used in the survey should confirm that all the items actually measure different aspects of the construct domain.

With regards to the moderating variables, it is highly recommended to elaborate on the composition and operationalization of the moderating variables. Since these variables implicate a social dimension, it is advised to inspect these items in the survey as well. Using the reflective-formative type approach and adding lower-order constructs to assemble these rather socially complex

constructs might be a good way to increase the validity of the constructs.

In further research, it might be beneficial to consider employing a qualitative research method when studying co-evolutionary IS alignment. Since collecting data on this target group turned out to be difficult, using focus groups or one-on-one interviews as means to collect data might be a more effective way to gather valuable data.

Concluding, a larger sample size and a longer period of time dedicated to data collection are recommended to collect a sufficient amount of respondents and work with an elaborate set of data. Moreover, public organizations in the Netherlands as the target group could be expanded to public sectors in, for example, a set of selected countries in Europe, which could provide an even larger and diverse dataset to work with.

5.4. Recommendations for practice

Public organizations operating in the fast changing IT environment might face difficulties with the incorporation of a sustainable business and IT alignment and could practically benefit from this study. Organizations active in the public sector are dependent on the interaction between individuals for organizational co-evolution between business and IT, and managers in the public sector have to be attentive when it comes to the bureaucratic impediments that arise with innovative practices (Stewart 2014).

This research and its outcomes can support public organizations with discovering various IS alignment problems and misalignment symptoms. Furthermore, the research can facilitate in distinguishing between internal and external complexity within the organization by not only encouraging discussion about IS alignment on a high(er) management level, but also between management and essential IS stakeholders. Attention can be devoted to the internal organizational aspects alignment motivation and interconnections with heterogeneous employees and its effect on the dynamic capabilities (such as the level of flexibility or organizational performance) of the organization. Lastly, this research contributes to the IT domain of science, and particularly to the, still developing, amount of research that has been done on co-evolutionary IS alignment.

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7. Appendices

7.1. Appendix A: Literature review

	Authors and publication date	Title	Key words
1.	P. M. Allen and L. Varga (2006)	A co-evolutionary complex systems perspective on information systems.	Complexity science, organizational evolution
2.	F. Amarilli, M. Van Vliet and B. Van Den Hooff (2017)	An Explanatory Study on the Co-evolutionary Mechanisms of Business IT Alignment	Complexity science
3.	P. Anderson (1999)	Perspective: Complexity theory and organization science	Complexity theory, organizational evolution
4.	H. Benbya and B. McKelvey (2006)	Using Coevolutionary and Complexity Theories to Improve IS Alignment: A Multi-level Approach	Information systems alignment, coevolution, complexity
5.	P. Walraven, R. Van De Wetering, R. Helms, J. Versendaal and M. Caniëls (2018)	Co-evolutionary IS-alignment: A Complex Adaptive Systems Perspective	Business-IT alignment, complex adaptive systems, co-evolutionary IS-alignment, alignment processes
6.	P. Walraven, R. Van De Wetering, J. Versendaal and M. Caniëls (2018)	Using a Co-evolutionary IS-alignment approach to understand EMR implementations. European Conference on Information Systems	Co-evolutionary IS-alignment (COISA), complexity science, electronic medical records
7.	P. Walraven, R. Van De Wetering, R. Helms, J. Versendaal and M. Caniëls (not published yet)	Toward Assessment of Efficacious Dynamics in Co-evolutionary IS-alignment processes: The case of Electronic Medical Records	Complex adaptive systems, COISA processes, interconnections between heterogeneous employees
8.	D. J. Teece, G. Pisano and A. Shuen (1997)	Dynamic capabilities and strategic management	Competences, capabilities, innovation, strategy, path dependency, knowledge assets
9.	R. Wilden, S. P. Gudergan, Nielsen, B. Bernhard and I. Lings (2013)	Dynamic capabilities and performance: strategy, structure and environment	Dynamic capability, performance, competition, organizational structure, PLS-SEM, confirmatory tetrad analysis, contingency theory
10.	R. Yu-Yuan Hung, T. Chung and B. Ya-Hui Lien (2007)	Organizational Process Alignment and Dynamic Capabilities in High-Tech Industry	Dynamic capability, process alignment, organizational performance
11.	A. Schwarz, M. Kalika, H. Kefi and C. Schwarz (2010)	A Dynamic Capabilities Approach to Understanding the Impact of IT-Enabled Businesses Processes and IT-Business Alignment on the Strategic and	Alignment, IT-enabled business process, Resource-Based View, Dynamic Capabilities Theory

		Operational Performance of the Firm	
12.	R. Yu Yuan Hung, B. Yang, B. Ya-Hui Lien G. N. McLean and Y. Kuo (2010)	Dynamic capability: Impact of process alignment and organizational learning culture on performance	Dynamic capability, process alignment, organizational learning culture
13.	R. Wetering, P. Mikalef and A. Pateli (2017)	A strategic alignment model for IT flexibility and Dynamic Capabilities: Toward an assessment tool	IT flexibility, dynamic capabilities, IS/IT-alignment, firm performance, assessment tool
14.	B. H. Reich and I. Benbasat (2000)	Factors that influence the social dimension of alignment between business and information technology objectives	Alignment, communication, shared knowledge
15.	A. Farazmand (1999)	Globalization and public administration	Globalization, automation, digitization, technology, dynamic environment, organizations
16.	A. Farazmand (1999)	The elite question: Toward a normative elite theory of organization	Globalization, automation, digitization, technology, dynamic environment, organizations
17.	B. R. Baliga and A. Jaeger (1984)	Multinational corporations: Control systems and delegation issues	Globalization, automation, digitization, technology, dynamic environment, organizations
18.	J. James (2001)	Information technology, cumulative causation and patterns of globalization in the third world	Globalization, automation, digitization, technology, dynamic environment, organizations
19.	J. James (2002)	Informational technology, transaction costs and patterns of globalization in developing countries	Globalization, automation, digitization, technology, dynamic environment, organizations
20.	S. Madon (1997)	Information-based global economy and socioeconomic development: The case of Bangalore	Economic globalization, information technology, case study, Bangalore
21.	M.S. Pang, G. Lee, and W. H. DeLone (2014)	IT resources, organizational capabilities, and value creation in public-sector organizations: a public-value management perspective	Information technology resources, organizational capability, government, public sector, public value, public-value management theory
22.	J. Stewart (2014)	Implementing an innovative public sector program: The balance between flexibility and control	Implementation, innovation, control, values, bureaucracy, small business programs
23.	J. Peppard and B. Campbell (2014)	The Co-evolution of Business/Information Systems Strategic Alignment: An Exploratory Study	Strategic alignment, co-evolution, IS strategy, business Strategy, feedback loops, grounded theory, learning
24.	Y. E. Chan and B. H. Reich (2007)	IT Alignment: An Annotated Bibliography	Alignment, linkage, fit, methods, theories, findings
25.	Y. E. Chan and B. H.	IT Alignment: What have we Learned?	Alignment, linkage, fit, models,

	Reich (2007)		measures, antecedents, outcomes, strategy, structure, culture, knowledge, social, dimensions
26.	J. Baker, D. R. Jones, Q. Cao and J. Song (2011)	Conceptualizing the Dynamic Strategic Alignment Competency	Dynamic capabilities framework, strategic alignment, dynamic capabilities, competitive advantage, strategic IS management, fit
27.	Y. Cui and H. Jiao (2011)	Dynamic capabilities, strategic stakeholder alliances and sustainable competitive advantage: evidence from China.	Dynamic capabilities, strategic alliances, corporate responsibility, competitive advantage
28.	N. Martin, S. Gregor and D. Hart (2005)	The social dimension of business and IS/IT alignment: case studies of six public-sector organisations	Alignment, social dimension, stakeholders, case studies
29.	Janssen, M. J., Castaldi, C., & Alexiev, A. (2016)	Dynamic capabilities for service innovation: conceptualization and measurement.	Dynamic capabilities framework, service innovation, dynamic capabilities, development measurement scale

7.2. Appendix B: Survey

Outcomes of Alignment Capabilities in the Public Sector

First of all we would like to thank you for participating in this survey!
This survey is meant to assess alignment in the public sector, including for example governmental organizations and educational institutes.
In this survey, you will be asked to answer 17 closed ended questions. Completing the survey will take approximately 15 minutes of your time.

This survey is carried out as a part of a research from graduate students of the Open Universiteit. There are no right or wrong answers, we aim to assess your own views.

Participation is completely voluntary and results will be processed anonymously. If you have any questions or remarks in relation to this survey or our research generally, please contact the student that invited you to this survey.

There are 17 questions in this survey.
(not mandatory)*

1. ***Which organisation do you work for?***
2. ***Please specify the business unit / department you work for.***
3. ****What is your job title?***
4. ***How long have you been working at your current organization? Please specify in months or years.***

5. Please choose the appropriate response for each item:
(1) Never
(2) Way too infrequently
(3) Too infrequently
(4) Somewhat in line with frequencies of changes
(5) Moderately in line with frequencies of changes
(6) Mostly in line with frequencies of changes
(7) Completely in line with frequencies of changes

1. Our organization periodically performs strategic IT planning processes (e.g., prioritizing IT projects).
2. Our organization frequently adjusts strategic goals to better adapt to changing conditions.
3. Our organization continuously works on creating the right conditions to enable implementation of strategic goals in relation to IT (e.g., setting up program structures and creating roadmaps).
4. When making strategic IT investment decisions, our organization actively considers strategic goals from different departments, roles, and perspectives.

6. Please choose the appropriate response for each item:

(1) Never
(2) Way too infrequently
(3) Too infrequently
(4) Somewhat in line with frequencies of changes
(5) Moderately in line with frequencies of changes
(6) Mostly in line with frequencies of changes
(7) Completely in line with frequencies of changes

1. Our organization continuously works on maintaining architectural principles and standards to guide systems development and maintenance projects.
2. Our organization continuously works on maintaining overall coherence between different processes, roles, and IT components.
3. When making architectural decisions, our organization actively considers coherence with strategic principles and goals.
4. Our organization actively works on ensuring relevance and topicality of architectural practices, principles and standards and makes changes accordingly.
5. **Architectural principles**
   Architectural principles of the organization can be seen as the general rules and guidelines for IT within the organization.

7. Please choose the appropriate response for each item:

(1) Never
(2) Way too infrequently to leverage any opportunities for improvement
(3) To the degree that we leverage some opportunities for improvement
(4) To the degree that we leverage a moderate amount of opportunities for improvement
(5) To the degree that we leverage a moderate amount of opportunities for improvement
(6) To the degree that we leverage a considerable amount of opportunities for improvement
(7) To the degree that we leverage (almost) all opportunities for improvement

1. Overall, end users spend efforts in recommending changes to IT in use to better fit their works. Overall, end users spend efforts on changing their tasks so that these better fit the IT in use.
2. Our organization continuously works on implementing and improving IT systems in operational settings to the degree that we leverage (almost) all opportunities for improvement.
3. Our organization continuously evaluates implemented IT systems for alignment with business processes and working routines.

8. Please choose the appropriate response for each item:

(1) Strongly disagree
(2) Disagree
(3) Somewhat disagree
(4) Neither agree nor disagree
(5) Somewhat agree
(6) Agree
(7) Strongly agree

1. Our organization ensures adequate stakeholder participation in IT development and -improvement efforts.
2. In our organization, IS/IT people and line people from various departments periodically attend cross-functional meetings.
3. Our organization takes conscious action to improve informal connections across functions and departments.
4. We have a dedicated platform where we share information across functions and departments, related to IT alignment efforts.

-IS/IT Alignment

To apply IT in an appropriate and timely way, in harmony with business strategies, goals and needs.

9. Please choose the appropriate response for each item:

(1) Strongly disagree
(2) Disagree
(3) Somewhat disagree
(4) Neither agree nor disagree
(5) Somewhat agree
(6) Agree
(7) Strongly agree

1. Our employees are intrinsically motivated to continuously leverage and improve IT initiatives.
2. Generally, our employees are enthusiastic to contribute to IT initiatives.
3. Our employees generally feel stimulated to engage in dialogues related to IT initiatives.
4. Our employees have clear reasons to actively collaborate with other stakeholders on leveraging and improving IT initiatives.

10. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. We systematically observe and evaluate the needs of our customers.
2. We analyze the actual use of our services.
3. Our organization is strong in distinguishing different groups of users and market segments.
4. Staying up-to-date with promising new services and technologies is important for our organization.
5. In order to identify possibilities for new services, we use different information sources.
6. We follow which technologies our competitors use.

-Customers
The group of people or entities where the organization does their activities for.

-Services
A valuable action, deed, or effort performed to satisfy a need or to fulfill a demand.

-Competitors
Comparable public organizations.

11. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. We are innovative in coming up with ideas for new service concepts.
2. Our organization experiments with new service concepts.
3. We align new service offerings with our current business and processes

-Services
A valuable action, deed, or effort performed to satisfy a need or to fulfill a demand.

12. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. Collaboration with other organizations helps us in improving or introducing new services.
2. Our organization is strong in coordinating service innovation activities involving several parties.

-Services

A valuable action, deed, or effort performed to satisfy a need or to fulfill a demand.

13. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. In the development of new services, we take into account our branding strategy.
2. Our organization is actively engaged in promoting its new services.
3. We introduce new services by following our marketing plan.

-Services

A valuable action, deed, or effort performed to satisfy a need or to fulfill a demand.

-Branding (strategy)

The process involved in creating a unique name and image for a product in the consumers' mind, mainly through advertising campaigns with a consistent theme. Branding aims to establish a significant and differentiated presence in the market that attracts and retains loyal customers.

-Marketing plan

Product specific, market specific, or company-wide plan that describes activities involved in achieving specific marketing objectives within a set timeframe. A market plan begins with the identification (through market research) of specific customer needs and how the firm intends to fulfill them while generating an acceptable level of return. It generally includes analysis of the current market situation (opportunities and trends) and detailed action programs, budgets, sales forecasts, strategies, and projected (proforma) financial statements.

14. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. Over the past 3 years, our financial performance has been outstanding.
2. Over the past 3 years, our financial performance has exceeded comparable organizations.
3. Over the past 3 years, we have been more profitable than comparable organizations.

-Profitable can also be read as cost efficient.

15. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. Customers perceive our organization's quality of services is better compared to other organizations in the same industry.
2. Our organization has higher customer satisfaction compared to other organizations in the same industry.
3. Our organization has better firm image compared to other organizations in the same industry.

-Customers

The group of people or entities where the organization does their activities for.

16. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. Our organization has better productivity improvements compared to other organizations in the same industry.
2. Our organization has better timeline of customer service compared to other organizations in the same industry.
3. Our organization has better production cycle time compared to other organizations in the same industry.

17. Please choose the appropriate response for each item:

(1) Very strongly disagree
(2) Strongly disagree
(3) Disagree
(4) Neither agree nor disagree
(5) Agree
(6) Strongly agree
(7) Very strongly agree

1. We use our Enterprise Architecture to identify new business and IT opportunities or potential threats.
2. We use our EA to mobilize resources in line with a potential solution when we sense business and IT opportunities or potential threats.
3. We successfully use our EA to adjust our business processes and the technology landscape in response to competitive strategic moves or market opportunities.
4. Overall, we use EA in the process of proactively addressing the rapidly changing internal and external business environment.

-Enterprise Architecture

Design or 'blueprint' of a business that depicts the components of a firm employed in its operations, interrelationships of those components, information flows, and how each component supports the objectives or the strategy of the enterprise.

-Resources

An economic or productive factor required to accomplish an activity, or as means to undertake an enterprise and achieve desired outcome. Three most basic resources are land, labor, and capital; other resources include energy, entrepreneurship, information, expertise, management, and time. (www.Businessdictionary.com)

We thank you for participating in this survey. We appreciate the information that you provided. The data will contribute to the analysis in our research.

Many thanks.